

BRIEF NOTE

NEW LOCALITY RECORDS OF CRAYFISHES FROM THE MIDDLE HUDSON RIVER SYSTEM¹

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The crayfish fauna of New York represents a mixture of three continental species groupings, often referred to as the Atlantic coast, Appalachian, and Great Lakes (preglacial Laurentian River) assemblages. Northward migration along the coast during the late glacial times brought the Atlantic group in contact with species of the Great Lakes assemblage migrating eastward through west-central New York. The Appalachian group, represented by a single species, *Cambarus bartonii*, probably spread throughout most of New York before the advent of either of the other groups. Specific migrations of dispersing crayfishes were made possible by the existence of short-term interdrainage connections created by the shifting drainage patterns of a receding glacial ice front.

The Hudson River system in eastern New York was the terminus for some of these late glacial migrations, particularly for those forms entering from the west via the former Glacio-Iromohawk River. In addition to late glacial reinvasion, artificial introductions by man have added species to the Hudson River fauna. It is unclear as to when these introductions commenced; however, remarks by Faxon (1885) regarding importation of crayfish to New York food markets suggest that they were occurring before the turn of the century.

The monograph on New York crayfishes by Crocker (1957) provides the foundation for any future study on this fauna. In addition to compiling the scattered data on New York crayfishes prior to 1957, Crocker proposed a pattern

of late glacial dispersal to account for specific species distributions. With the possible exception of some necessary future reinterpretation of the late glacial dispersal models, no new evidence has emerged to discount Crocker's hypothesis.

Crocker (1957) derived much of his data for his discussion on distribution

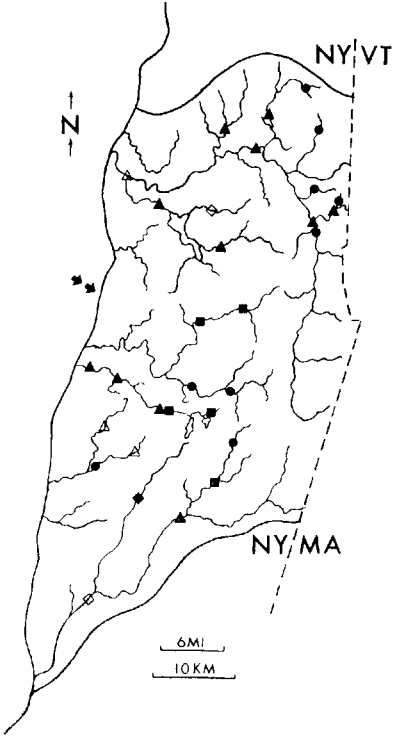


FIGURE 1. Map of study area showing the distribution of native crayfishes. ♦ *Orconectes limosus*, ▲ *O. propinquus*, ■ *Cambarus robustus*, ● *C. bartonii*. Open symbols denote previous records heavy arrows indicate mouth of Mohawk River.

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from the series of watershed surveys conducted by the New York State Conservation Department from 1926 to 1939. Although Crocker supplemented this early material with subsequent collecting of his own, large portions of the fauna of the eastern Hudson River watershed remained relatively unknown. The present study provides additional distributional data for crayfishes in the middle Hudson River system and discusses some problems concerning particular species distributions, notably those of *Orconectes virilis* and *Cambarus robustus*.

My investigations were carried out in the middle Hudson River watershed during August 1976, from July to October 1977, and in June 1978, in Columbia, Rensselaer and Washington Counties in New York State. Collecting was done by hand, or with the aid of a Turtox® indestructible dip net. An improvised wedge-shaped weir constructed of $\frac{1}{4}$ inch wire screen attached to a metal frame was found to be very successful for securing specimens in shallow swift rocky streams. Figure 1 shows the distribution of crayfishes in the study area.

All preserved specimens have been placed in the invertebrate collections of the Museum of Zoology, University of Massachusetts at Amherst. Species synonymies have been provided only where relevant to Crocker's (1957) study on New York crayfishes. All specimen listings under new locality records refer to adults unless otherwise indicated.

NEW LOCALITY RECORDS AND DISCUSSION

Orconectes limosus (Raf.)

Rensselaer Co.: Nassau, Valatie Kill, 9 Aug. 1976, 2♂I, 2♂II, 4♀, 1♀ immature.

Orconectes propinquus (Girard)

Orconectes propinquus propinquus (Girard)
Crocker, 1957.

Rensselaer Co.: Nassau, Kinderhook Creek, 9 Aug. 1976, 4♂I, 2♀; Hoosick, Hoosic River, 18 July 1977 and 29 June 1978, 1♂I, 4♂II, 8♀; Hoosic, unnamed tributary to Browns Brook, 29 June 1978, 3♀; Sand Lake, Wyants Kill, 26 June 1978, 1♂I, 3♂II, 8♀; North Greenbush, Wyants Kill, 26 June 1978, 3♀; Troy, Wyants Kill, 28 July 1977, 1♂I, 3♀.

Washington Co.: Cambridge, Fly Creek, 28 July 1977, 2♂I, 2♀; White Creek, Owl Kill, 28 July 1977, 1♂I, 3♀.

Crocker (1957) expressed difficulty in

distinguishing *O. propinquus* from *O. obscurus* in New York, utilizing the presence or absence of a medium rostral carina. Fitzpatrick (1957), however, indicated that *O. propinquus* possesses a carina while *O. obscurus* did not, and separation to species by use of this character was almost always complete. All specimens of *O. propinquus* collected during this study had an evident, though sometimes weakly developed, rostral carina.

A third species, *O. obscurus* (Hagen) also occurs in limited areas of the upper Mohawk River system (Crocker 1957, Crocker and Barr 1968); however, Fitzpatrick's (1967, figure 2) depiction of its presence also in the lower Hudson River and Upper Delaware River systems is erroneous. Crocker indicated that a previous collection of *O. obscurus* had been made in Kinderhook Creek in the middle Hudson River system which later he was not able to repeat. Collecting in 1976 and 1977 in Kinderhook Creek and its tributaries in Nassau township and in New Lebanon township (Columbia Co.) did not reveal *O. obscurus*.

Orconectes virilis (Hagen)

Columbia Co.: New Lebanon, Kinderhook Creek, 15 Sept. 1977, 4♂I, 1♀.

Rensselaer Co.: Nassau, Kinderhook Creek, 9 Aug. 1976, 2♂II, 2♀; Hoosick, Hoosic River, 18 July 1977, 1♂I, 1♂II, 1♀; Hoosick, Walloomsac River, 9 Sept. 1977, 1♂I, 3♀ immature; Hoosick, unnamed stream (Breese Hollow), 29 June 1978, 1♂I, 1♂II; Troy, Wyants Kill, 28 July 1977, 2♀; North Greenbush, Wyants Kill, 26 June 1978, 1♀.

Crocker (1957) proposed two means of entry of *O. virilis* into the Hudson River system: either dispersal through a temporary late glacial connection between the Lake Champlain and Hudson River watersheds, or by way of artificial introduction. He further stated that if the first hypothesis was correct, then the few populations of *O. virilis* occupying the upper Hudson River system were relicts of the interdrainage transfer. If *O. virilis* entered the upper Hudson River system, as suggested by Crocker, then the species should have spread rapidly into available habitats and persisted as did *O. propinquus*. As shown by Schwartz *et al* (1963) and Bovbjerg (1970), *O. virilis* is a very aggressive colonizer, often driving

out already existing populations of other species. The presence of *O. virilis* in the Hudson River system is probably the result of introductions by man, and introductions of this species are probably still going on, as evidenced by the increase in incidence of *O. virilis* in the Hudson River system since Crocker's study.

Cambarus (Punciticambarus) robustus (Girard)

Rensselaer Co.: Grafton, Quacken Kill, 28 July and 9 Sept. 1977, 2♂I, 4♂II, 3♀; Brunswick, Quacken Kill, 9 Sept. 1977, 3♂ immature; Nassau, Tackawasick Creek, 15 Sept. 1977, 3♂II, 1♀ immature; Sand Lake, unnamed tributary to Wyants Kill, 26 June 1978, 3♂II, 3♂ immature, 1♀, 6♀ immature; Sand Lake, Wyants Kill, 26 June 1978, 4♂II.

The locality records established in 1977 and 1978 might be interpreted as the result of either migration to the middle Hudson River system during late glacial dispersal, or as introductions by man. Each locality is a rocky stream with moderate to strong current, and all occur in a drainage area characterized by Great Lakes species. Furthermore, each stream is situated near the mouth of the Mohawk River, although one, Tackawasick Creek, is part of the upper Kinderhook Creek system which empties into the Hudson River farther south in Columbia County. It is possible that an interdrainage transfer occurred between the adjacent Tackawasick Creek and the Wyants Kill system through a hypothetical 5 mile long connection in the intervening low Sand Lake region when this area was still influenced by excessive meltwater drainage. The present records would fill a geographic gap between the upper Hudson and Mohawk River drainage localities cited by Crocker (1957) and establish the species eastern range limit.

Diagnoses of the 32 specimens collected during 1977 and 1978 revealed cervical spines on specimens from 19 to 35 mm carapace length with the greatest frequency of spines occurring from 19 to 25 mm.

Cambarus (Cambarus) bartonii (Fab.)

Cambarus bartonii bartonii (Fab.) Crocker, 1957
Rensselaer Co.: Hoosick, Hoosic River, 18 July 1977, 1♀; Hoosick, unnamed tributary to Browns Brook, 29 June 1978, 3♀; Hoosick, Woods Brook, 29 June 1978, 1♂II; Nassau, Tackawasick Creek, 15 Sept. 1977, 1♂II; Poestenkill, 10 Oct. 1977 and 26 June 1978,

3♂II, 2♂ immature, 2♀, 2♀ immature; Schodack, Moordener Kill, 9 Aug. 1976, 1♀, 1♀ immature.

Washington Co.: White Creek, Little White Creek, 29 June 1978, 1♂II; White Creek, White Creek, 29 June 1978, 1♂I, 1♂ immature, 1♀.

A single adult form II male of *C. bartonii* (UMA No. AR. 798, Rensselaer Co., Tackawasick Creek) is morphologically intermediate between typical *C. bartonii* and *C. robustus* (which occurs syntopically in the same stream) by possession of 2 rows of tubercles along the mesial margin of the propodus of percopod.

In New York, major populations occur in the Adirondack, Allegheny, Catskill and Taconic Mountain areas. Although both Crocker (1957) and Ortmann (1906) listed records for the Hudson River system, most of the central Taconic region was not included. The localities presented in this study suggest no deviation from the distribution patterns discussed by Crocker (1957). In the area studied, *C. bartonii* was found frequently only in the Poestenkill and the upper Hoosic River system (except the polluted Little Hoosic River). Otherwise, *C. bartonii* was rare. The scarcity of *C. bartonii* might reflect the combined effects of a warming climate, pollution, and artificial introduction of other crayfish species.

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